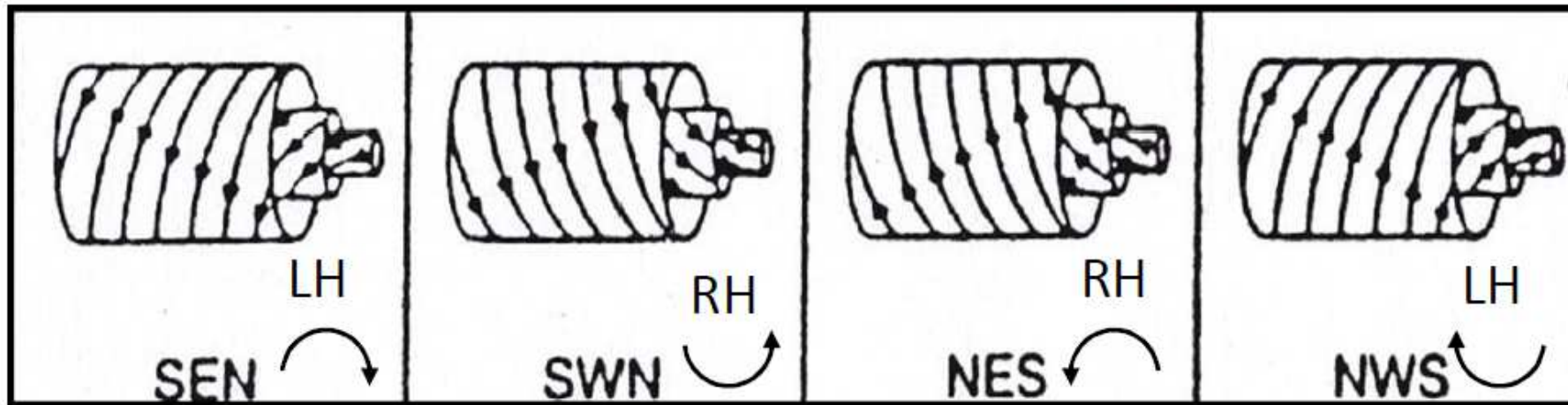


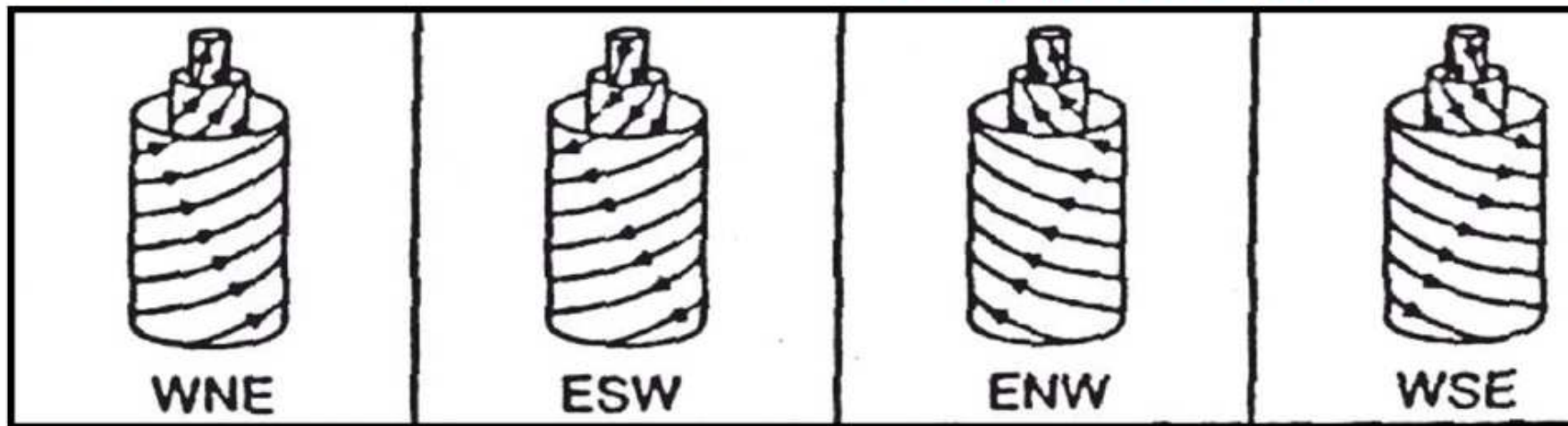
Interior Structure of Flux Rope

Low inclination flux ropes (bipolar): **south-north (SN) or north-south(SN)**



handedness: how B is observed to rotate as viewed by an observer looking towards the Sun
LH = clockwise; RH = counter clockwise

High inclination flux ropes (unipolar): **north (N) or south (S)**



Bothmer and Schwenn (1994);

Mulligan et al. (1998)

A cylindrically symmetric force-free field model for magnetic cloud

$$\nabla^2 \mathbf{B} = -\alpha^2 \mathbf{B}. \quad (3)$$

Lundquist [1950] has given the solution of equation (3) with the helical structure in the cylindrical geometry as follows:

$$\begin{cases} B_R = 0 & \text{radial component} \\ B_T = B_0 H J_1(\alpha R) & \text{tangential component} \\ B_A = B_0 J_0(\alpha R) & \text{axial component} \end{cases} \quad (4)$$

where J_n is the n th-order Bessel function, $H = \pm 1$ denotes the right- and left-handedness of the field twist, B_0 is the field intensity at the axis of the rope, and R is the radial distance from the axis.

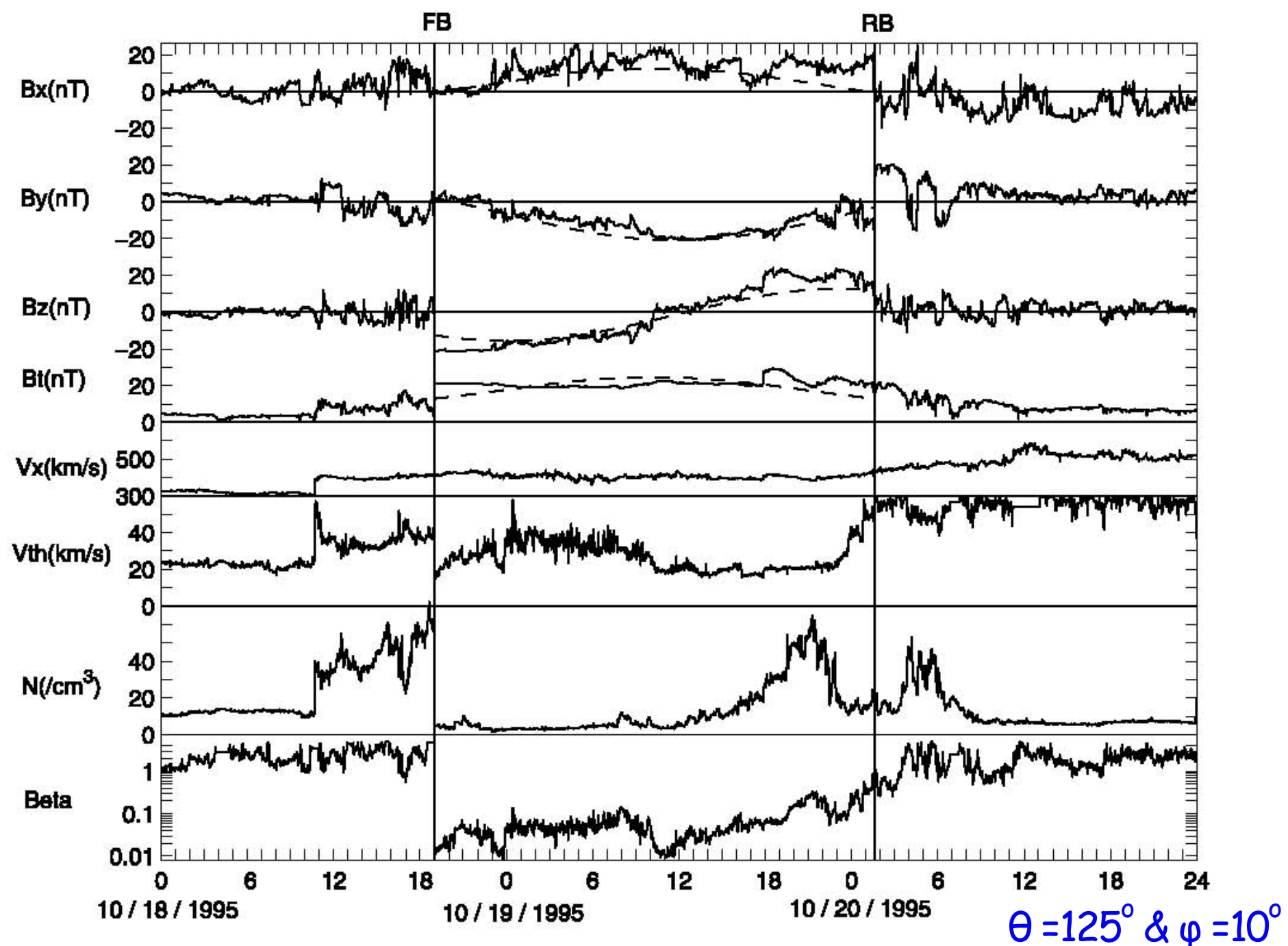
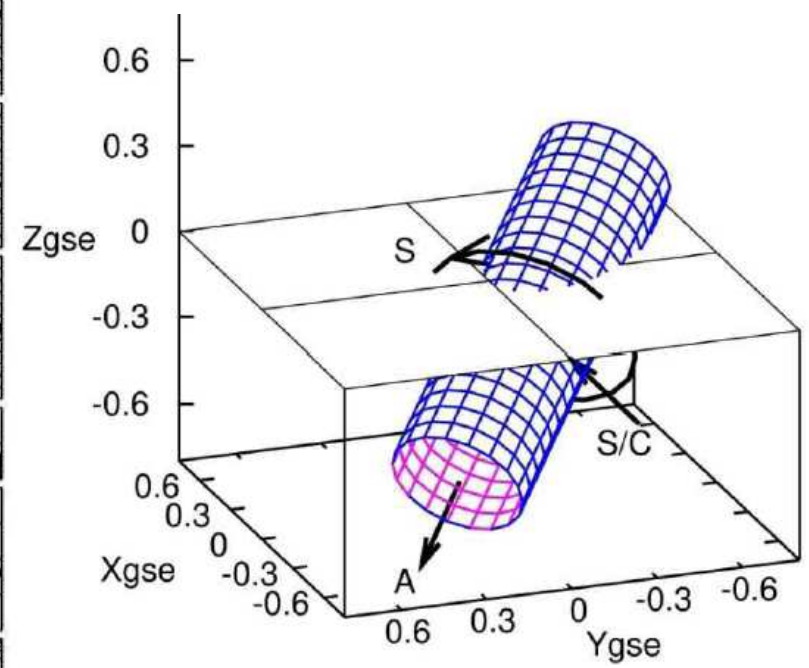
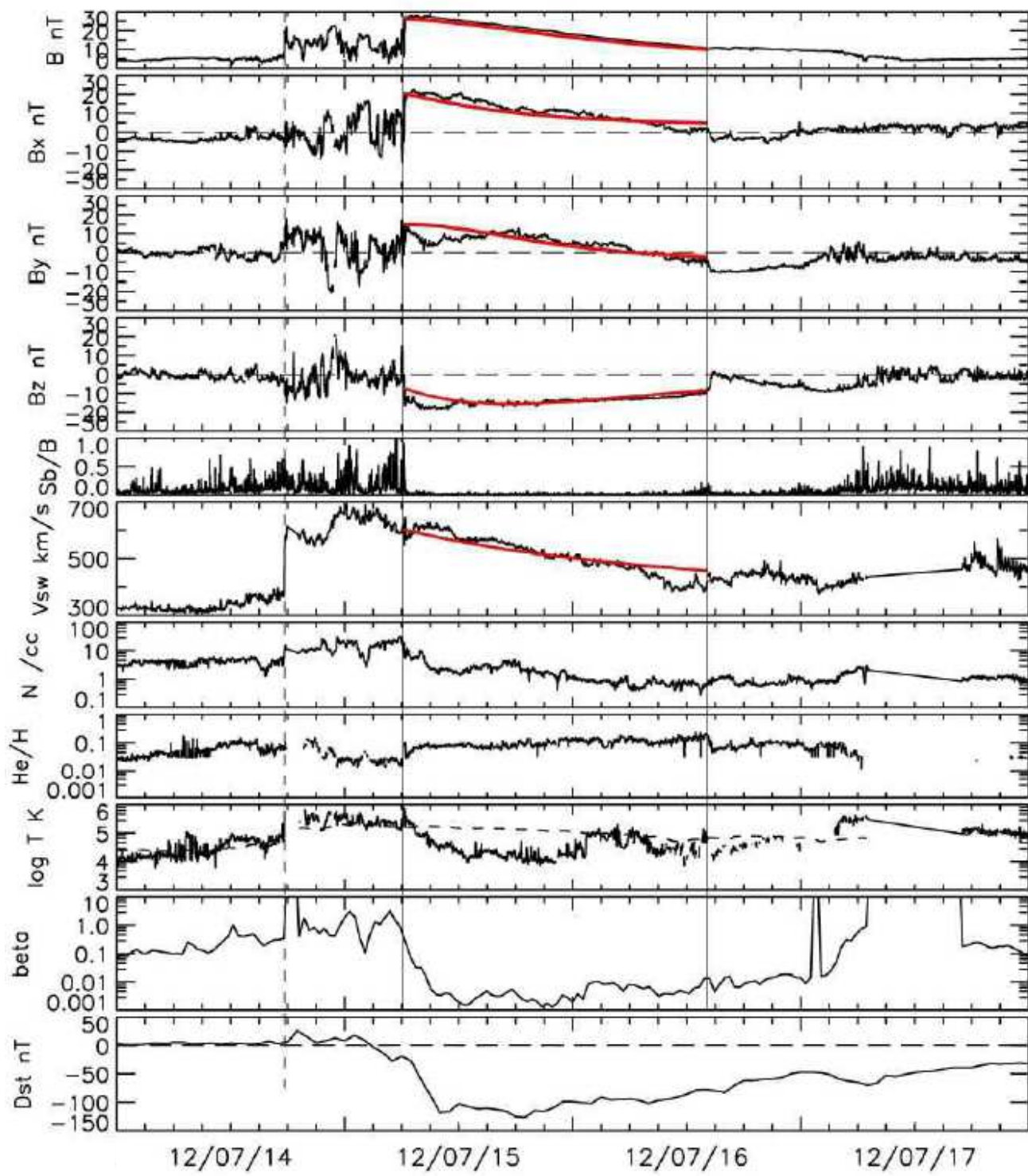
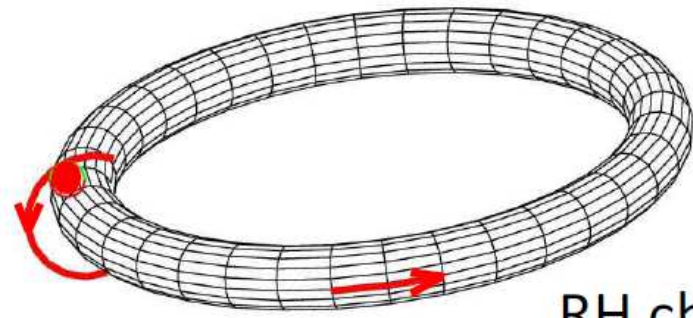
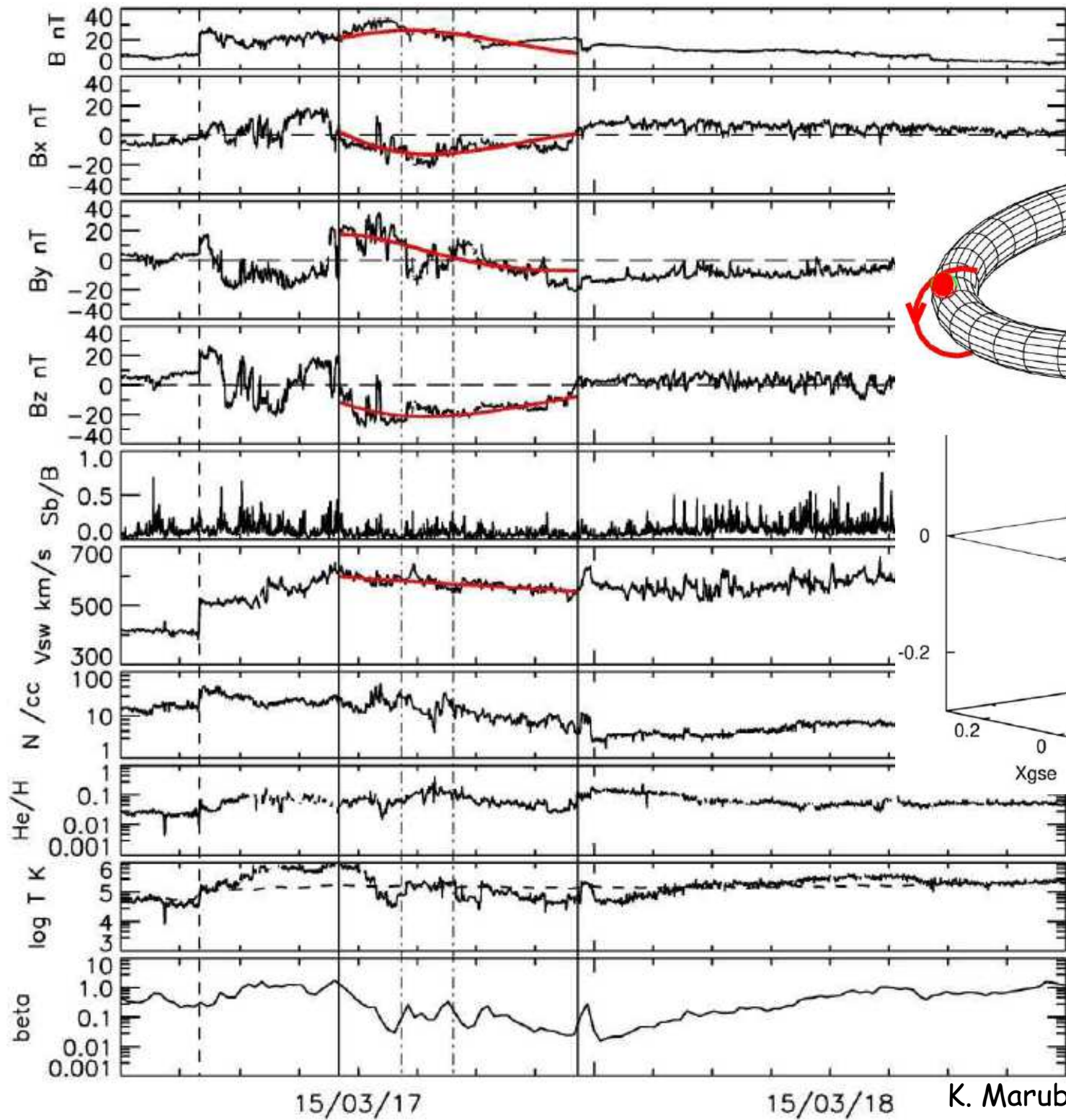
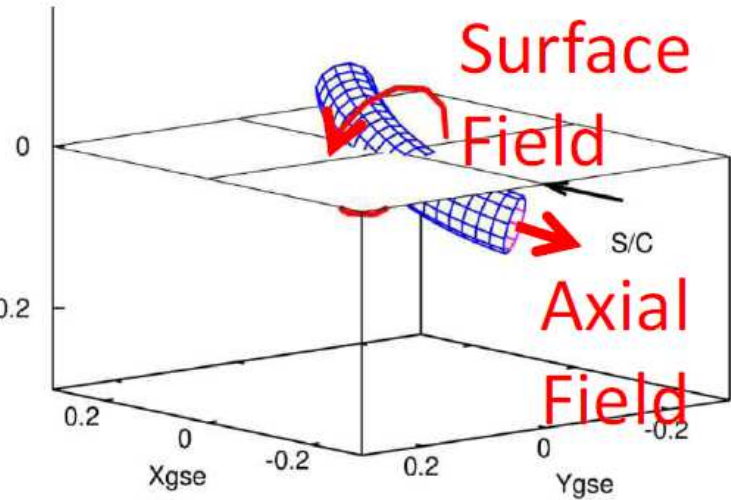


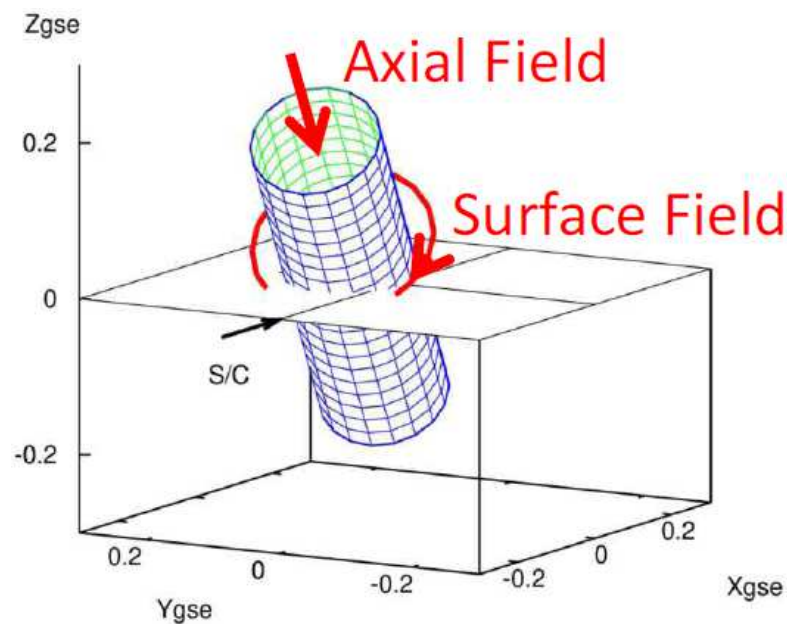
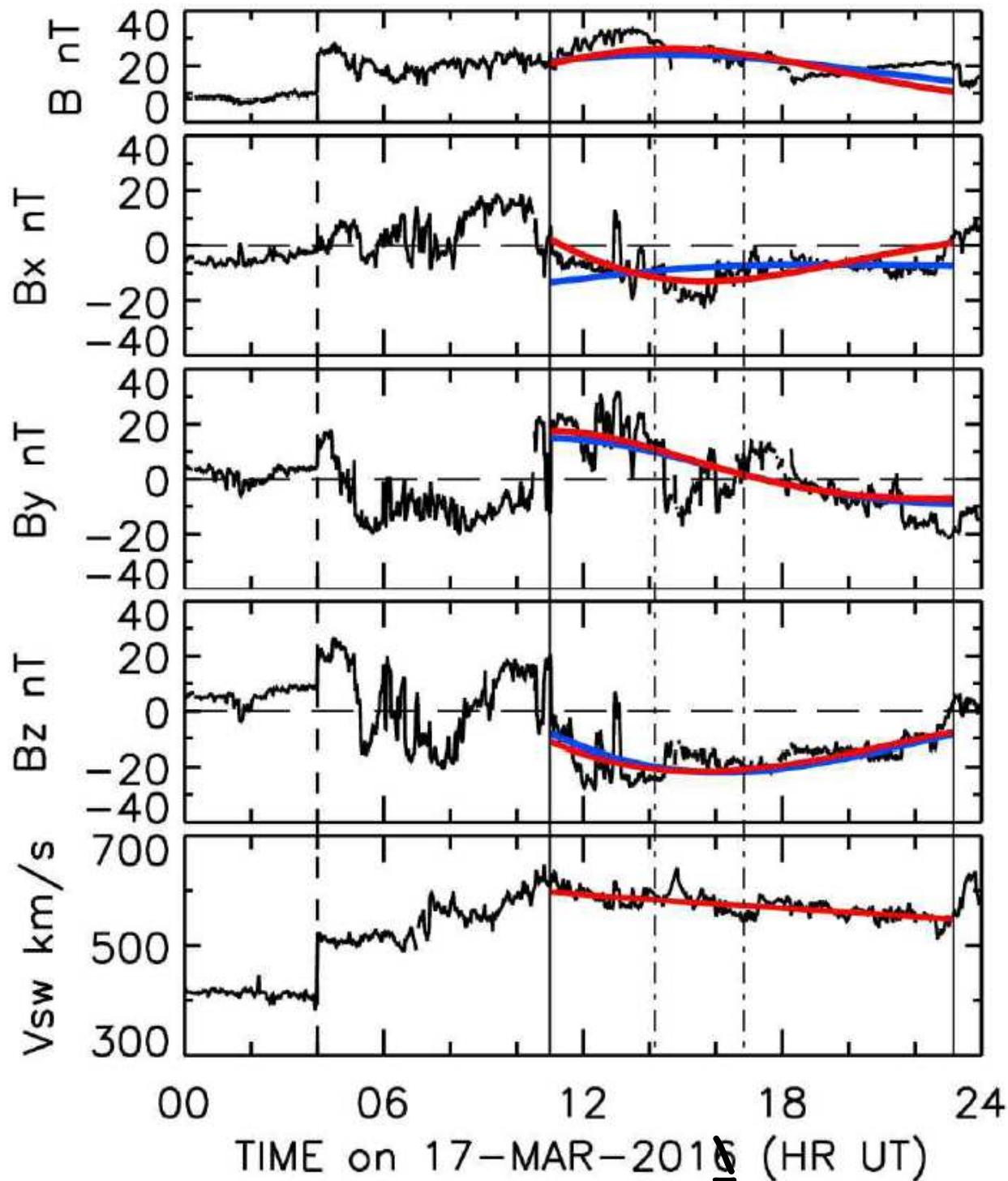
Figure 5. The interplanetary magnetic field and plasma data measured by the Wind spacecraft in GSE coordinate system during the 18–20 October 1995 MC passage and the flux-rope fitting curves (dashed curves). FB and RB are the front boundary and rear boundary, respectively.



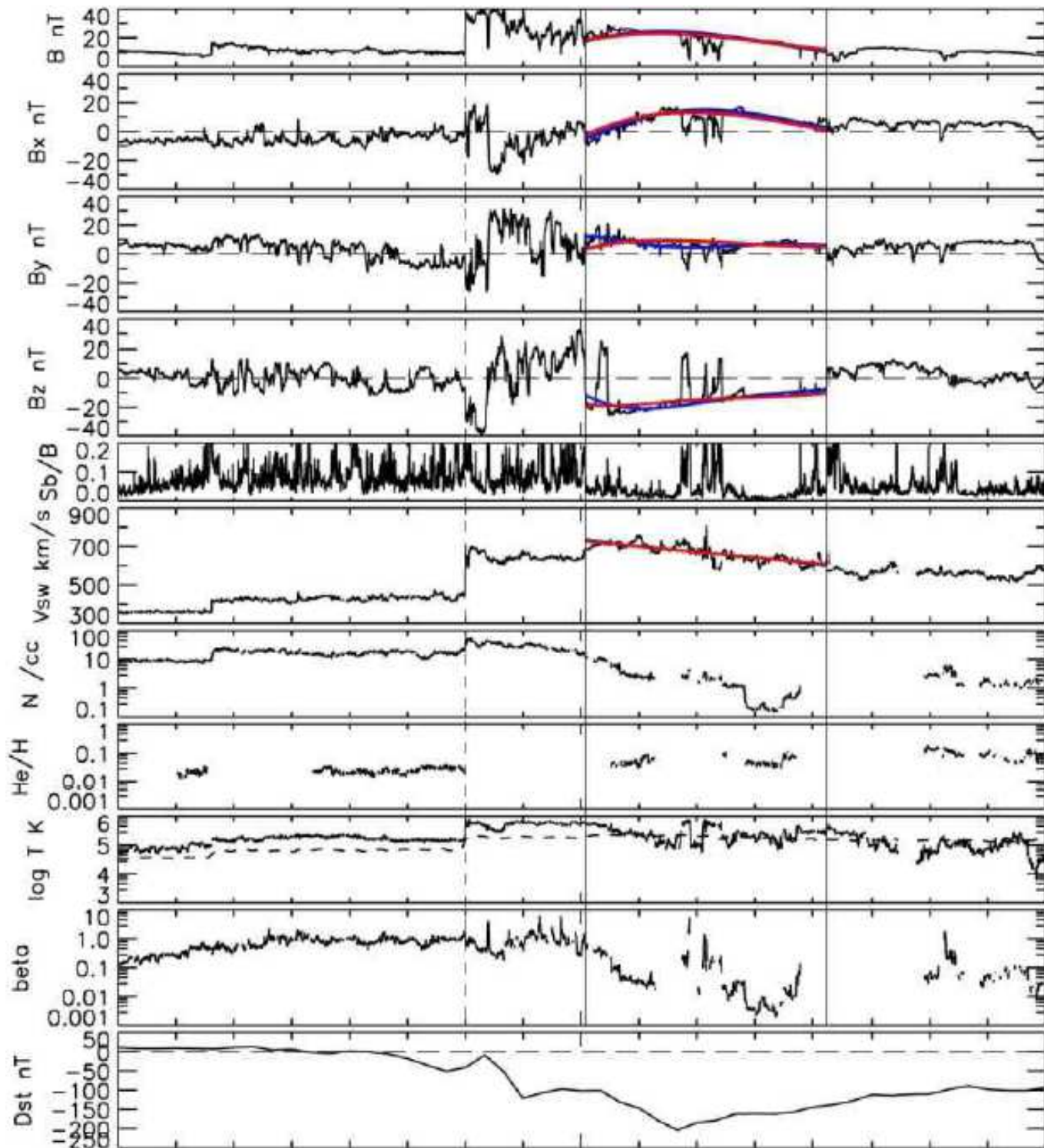


RH chirality

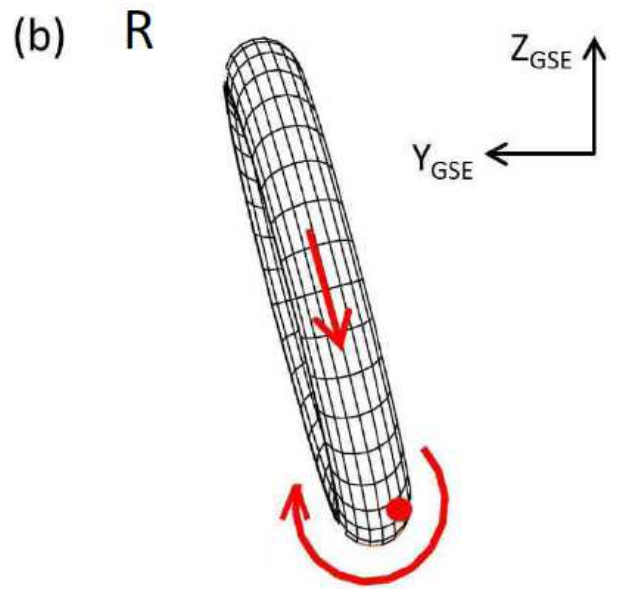
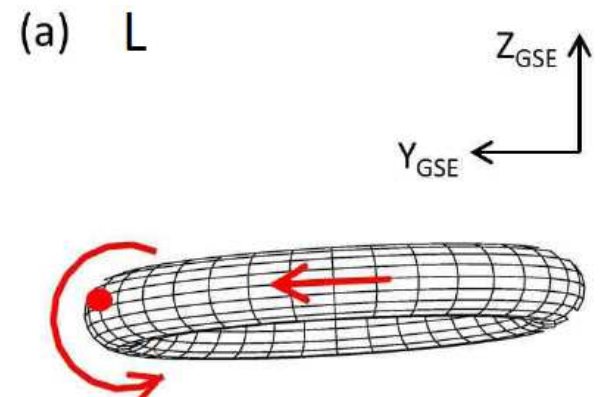




Cylinder-fit
Torus-fit

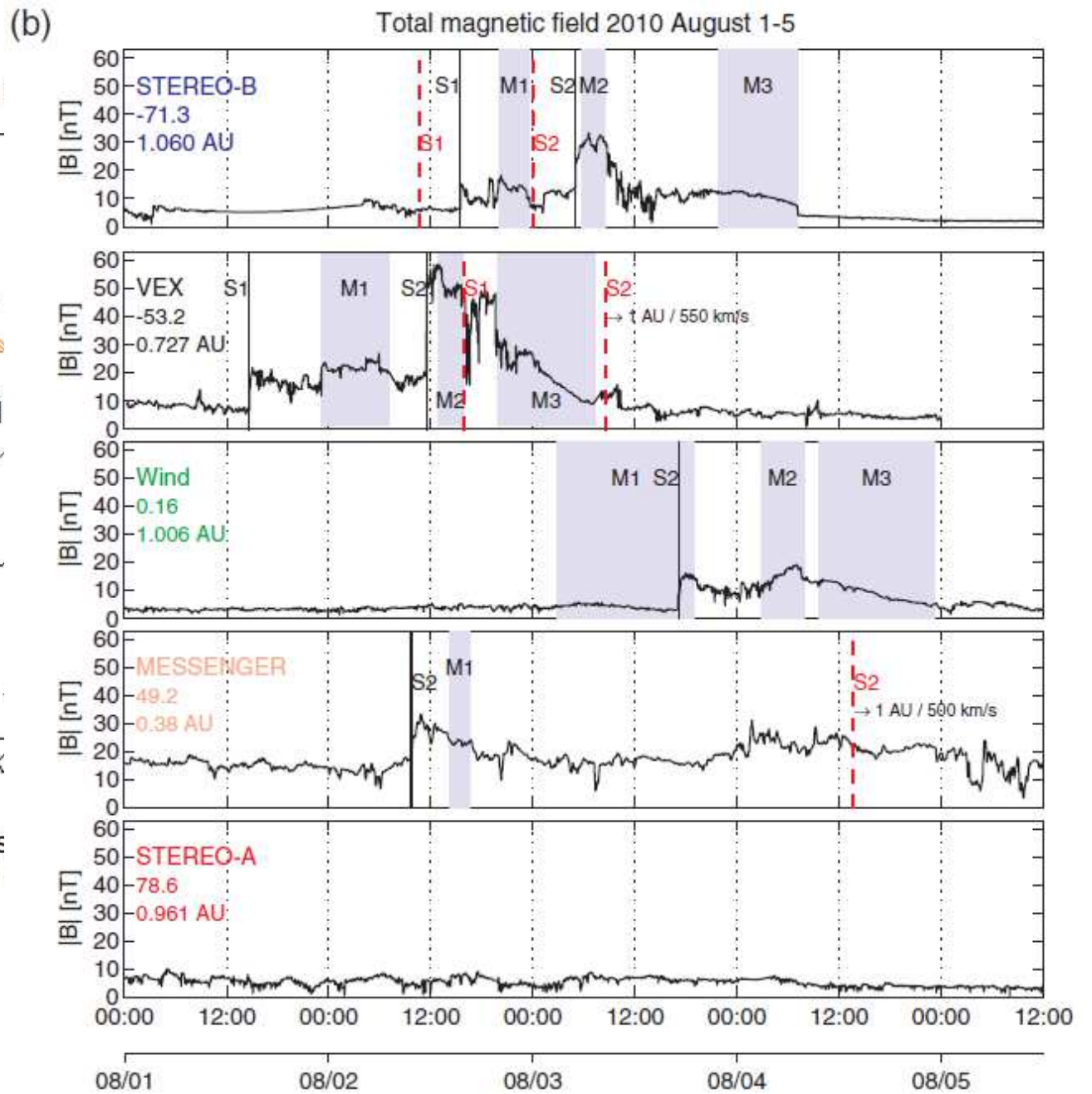
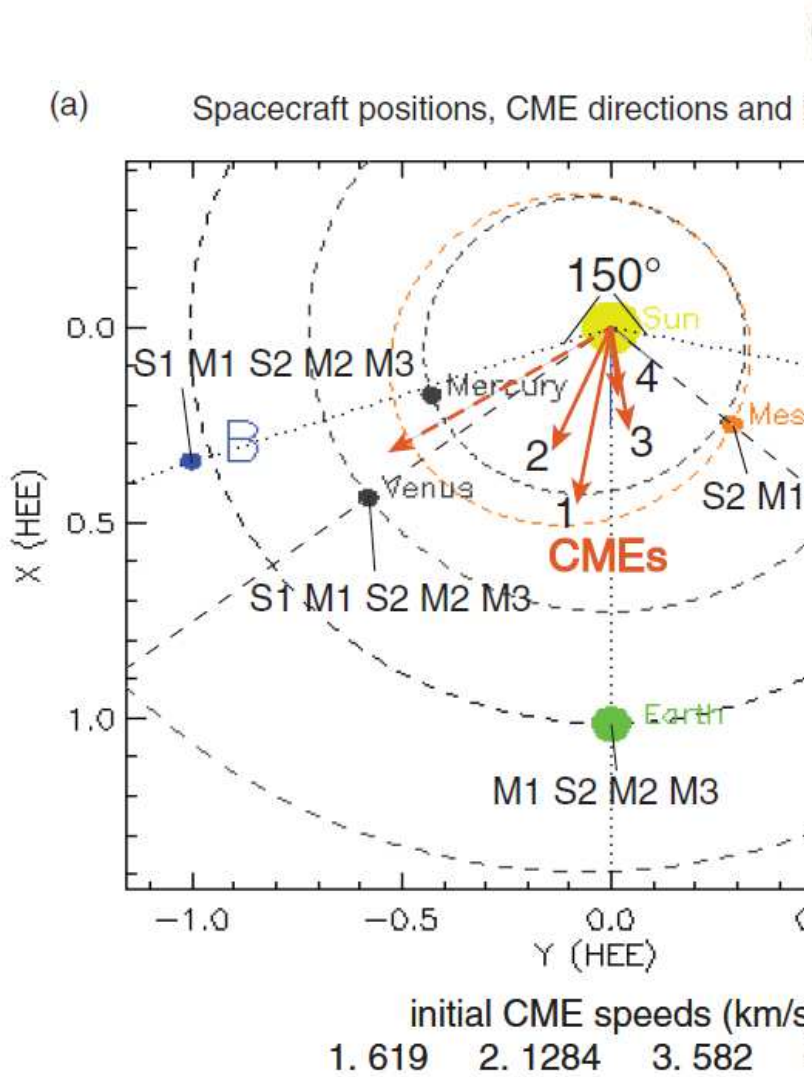


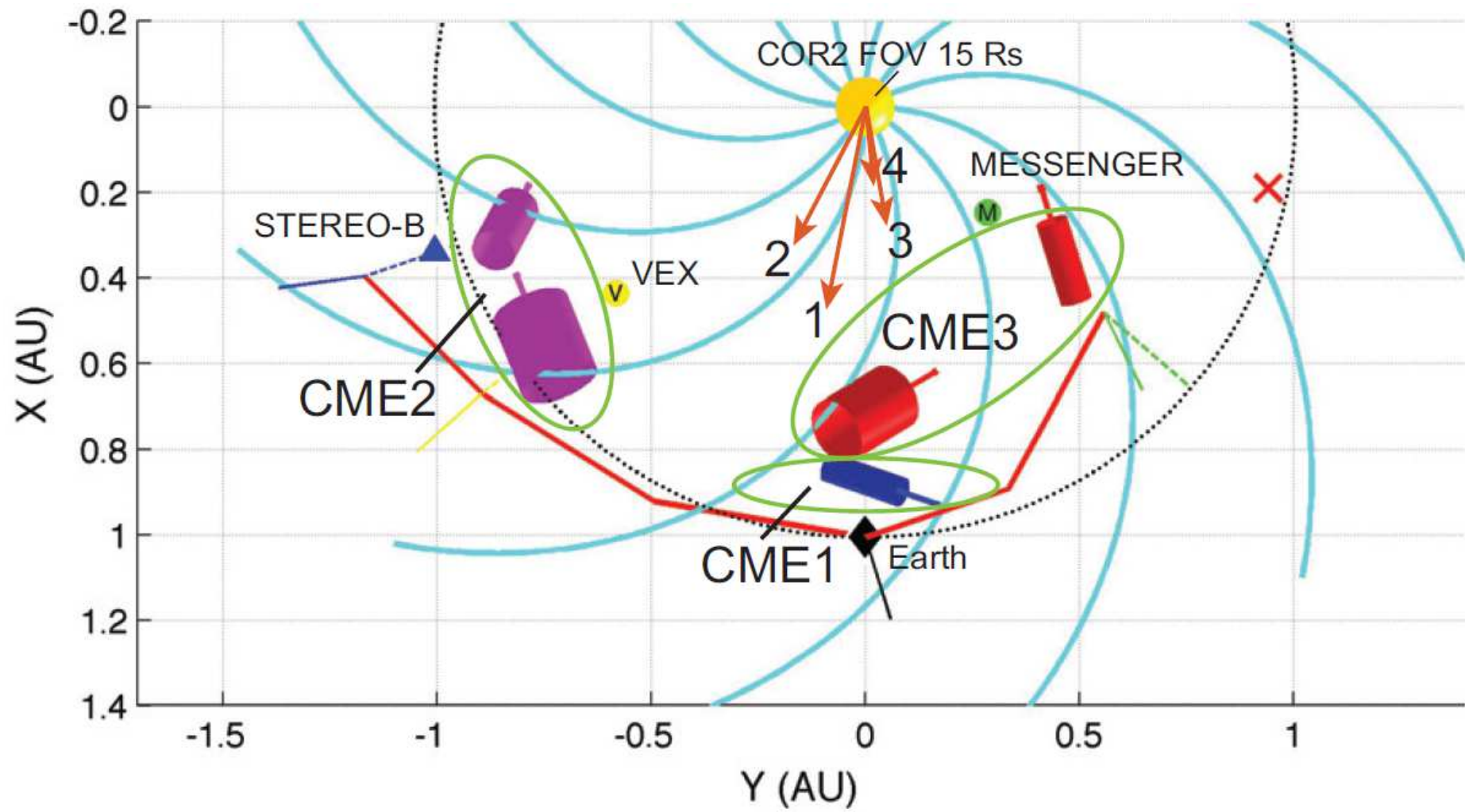
Left-handed
Right-handed

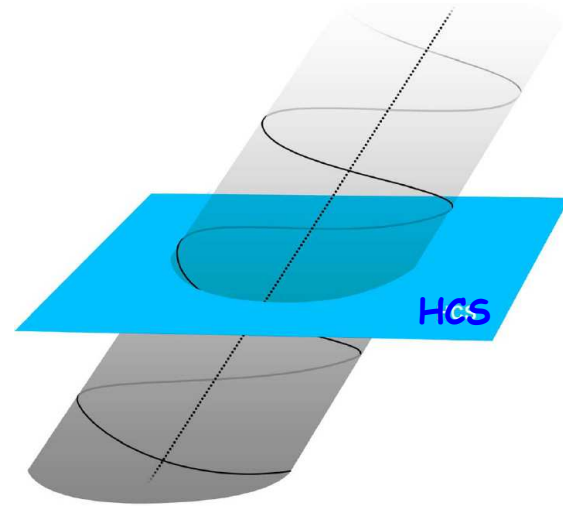
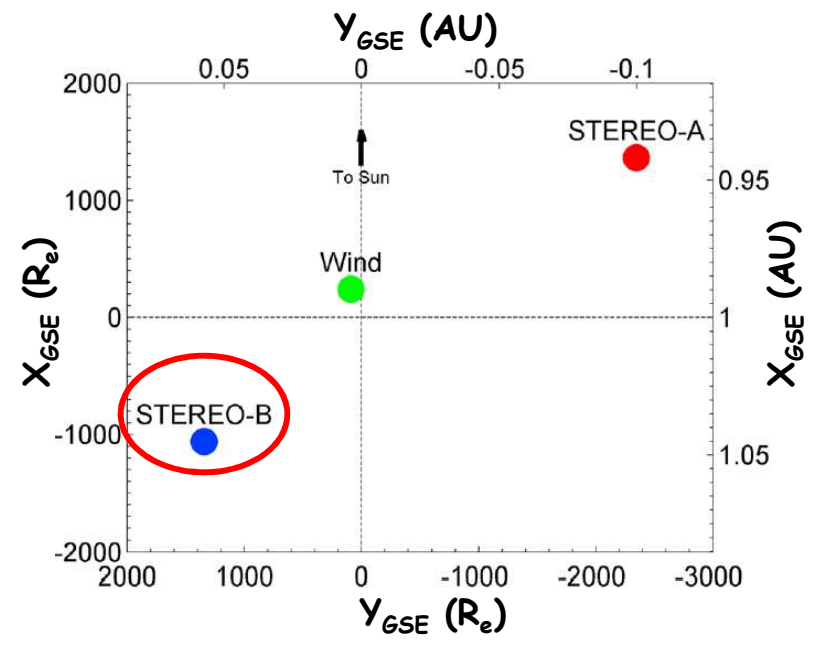
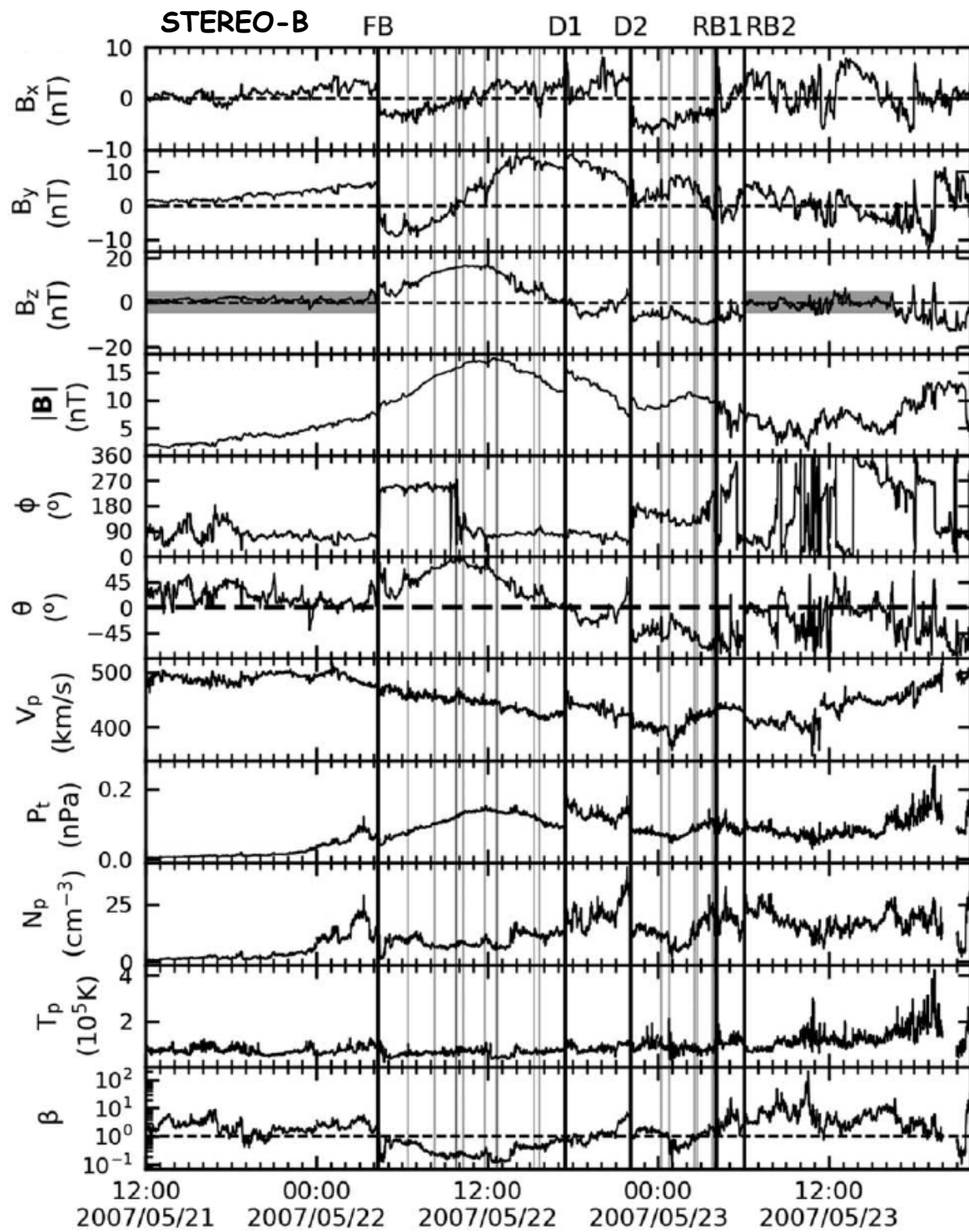


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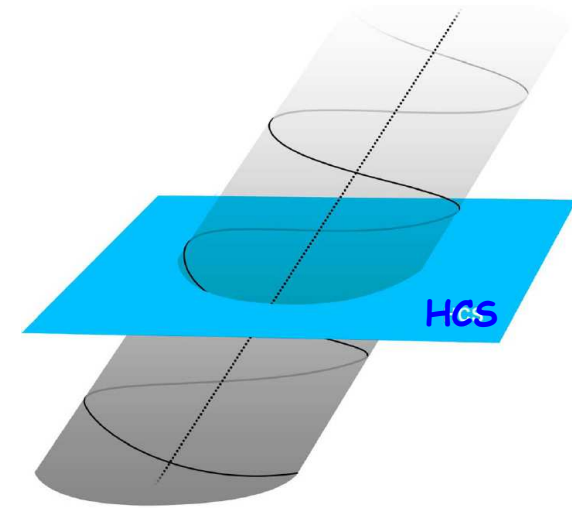
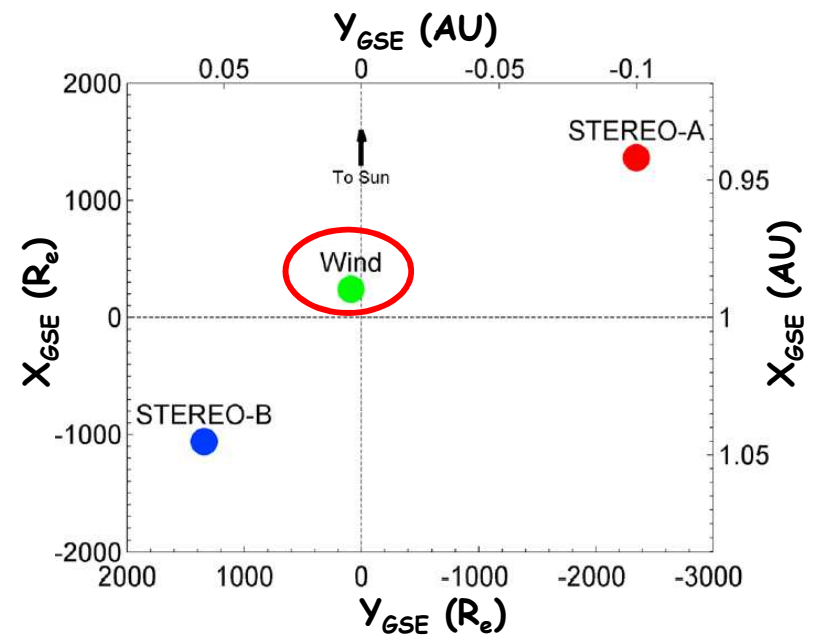
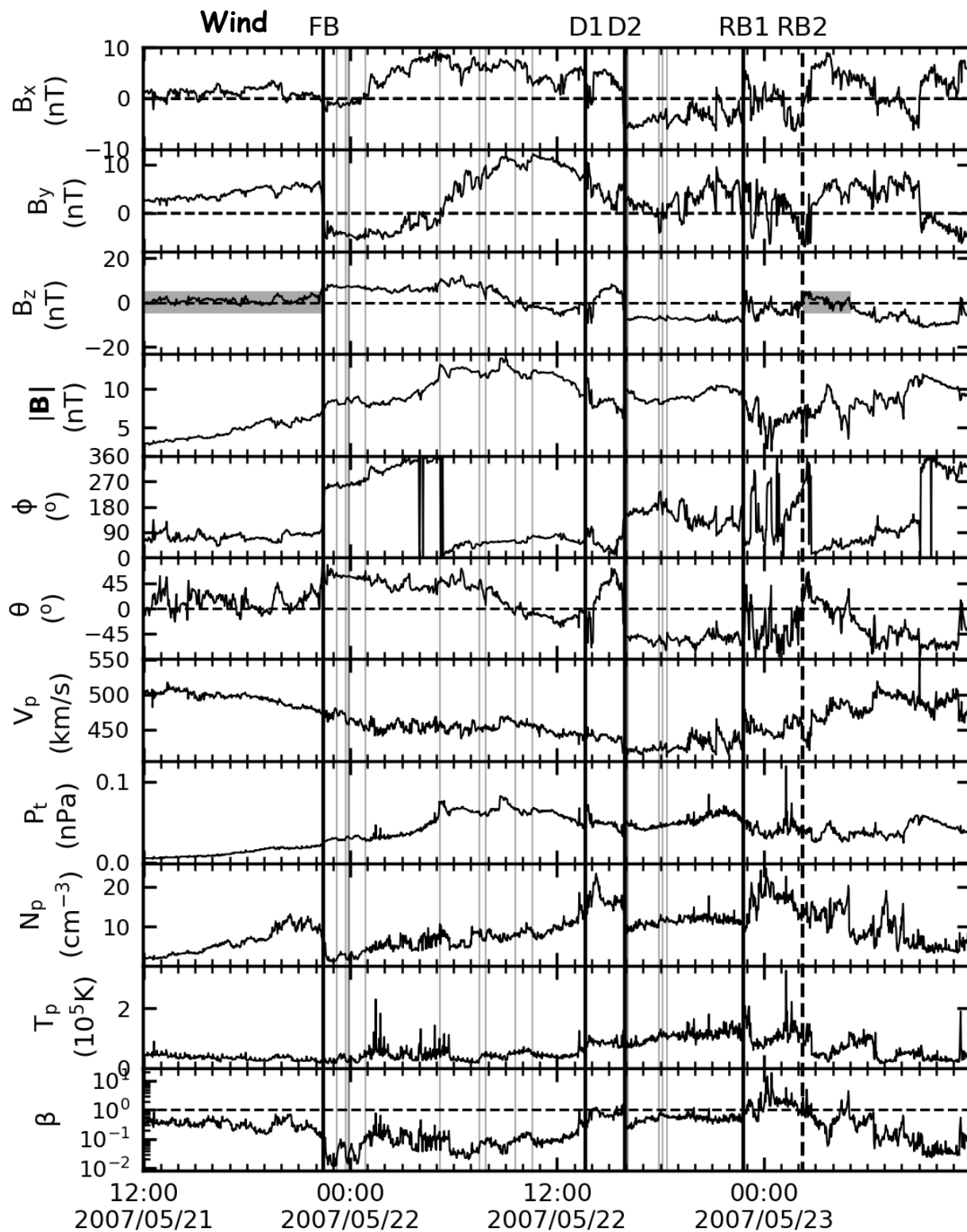
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Highly-inclined MC embedded in the HCS lying on the ecliptic plane



Highly-inclined MC embedded in the HCS lying on the ecliptic plane